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## ACCLIMATIZATION OF FOREIGN TREES AND PLANTS.\*

BY ALFRED W. BENNETT.

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THE introduction of new forms of vegetable life into our gardens and greenhouses has made considerable progress during recent years. The Acclimatization Societies of Paris and London have, it is true, paid more attention to the domestication of foreign animals than of plants; something, however, has been attempted in this direction, and with considerable success. This branch of acclimatization would, indeed, seem likely to be the most fertile in results beneficial to mankind. For one fresh animal introduced that will be of real utility, there will probably be a dozen plants that yield important economical products. The early races of mankind appear to have exhausted our powers over the lower animals—the horse, the ass, the dog, the camel, the ox, the sheep, were all brought under subjection to man at the earliest period of his history; and within historic times no important addition has been made to the number of our domestic animals. Not so with plants. A large number of the vegetable substances used as food at the present day, and of the vegetable articles of manufacture, were unknown to the ancients; and the field for farther extension of our utilization of the vegetable kingdom seems indefinitely large. The power of cultivation in modifying plants is also much greater than any corresponding power of domestication in modifying animals. The oldest extant drawings of the horse, the ox, or the camel, scarcely point out any distinctive features from their descendants now living; the potato and the apple, on the other hand, may almost be considered as man-

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\*This article is introduced since it contains many hints of use to florists and gardeners in the middle states especially, where many subtropical plants can with care be made to grow. — EDITORS.

ufactured products ; while many gardeners' flowers, such as the Pelargonium and the Tulip, differ so widely from their ancestors as, in some cases, to obscure their parentage. The term acclimatization has been objected to by some scientific men, on the ground that the descendants of any animal or plant which has been transported from one climate to another have no more power than their ancestor of adapting themselves to that climate, unless the principle of Natural Selection has come into play to eliminate the individuals least able to adapt themselves to the new climate, those only surviving which, from some cause or other, are most suited to the fresh conditions. Be this as it may, there is no question about the fact that the farmer and the gardener have it in their power to naturalize plants foreign to our climate and our soil.

But the conditions of this naturalization are by no means so simple as might at first sight appear. It might naturally be supposed that all we have to do is to introduce those plants which grow spontaneously in a climate and a soil similar to our own, and that they will necessarily flourish, and will scarcely be aware of the change. Or, if they come from a warmer country that all that is needed is to protect them by glass and artificial warmth from the inclemency of our winters. But in practice this is not found to be the case. A plant will frequently obstinately refuse to become naturalized in a country, the climatal and geological conditions of which are similar to those that occur in the region where it is indigenous. Our common daisy, a native of almost every country of Europe, is said to have resisted all attempts to introduce it even into the gardens of the United States. Some plants seem to have an unconquerable aversion to the fostering hand of man, even in their own country. A well-constructed and carefully kept fernery will contain specimens, more or less luxuriant, of nearly all our native ferns ; the polypody and hartstongue from shady banks and tree-stumps ; the so-called male and female ferns from the woods ;

the spleenwort from dry walls; even the royal "flowering-fern" from bogs; and some of the semi-alpine species will flourish with the exercise of a little care. One kind, however, is almost invariably absent, and that the most widely distributed of all our ferns, the common brake, a native of every county and almost of every parish in the country, but which can seldom be induced to remain a denizen of soil that has once been brought under man's dominion. On the other hand some of the greatest favorites of our gardens, which display no coyness whatever in overrunning our flower-beds, are natives of countries where the climate presents very different features to our own, or of very limited tracts of our own country, to which they seem strictly confined by impassable barriers of soil or meteorological conditions. To take instances of the latter phenomenon:—There is no garden flower more cosmopolitan in its tastes, more certain to thrive under any conditions of light or heavy soil, sun or shade, care or neglect, even in the heart of a town, as its very name seems to indicate, than the London Pride. Yet the *Saxifraga umbrosa* is one of the most restricted in distribution of our native plants. Abundant enough where it does grow, it is yet entirely confined to the moist equable climate of the hilly country in the south-west of Ireland and a few other similar localities, beyond which it is never found in the wild state. Botanists will think themselves amply repaid for a toilsome day's march by gathering the beautiful *Polemonium cæruleum* in its native habitat among the calcareous hills of the west of Yorkshire; yet the Jacob's Ladder is an ornament of every garden on the very stiffest part of the London clay. Probably every piece of cultivated ground, which contains a laburnum tree, produces each spring a plentiful crop of self-sown young trees, which come up without the least care or protection until destroyed in the process of weeding; yet the laburnum shows no disposition to take a place among the naturalized trees of our woods and hedges, although the seeds must often be carried there by

birds. It is remarkable that many of our common vegetables, the cabbage, the asparagus, the sea-kale, the celery, are natives of our own shores, never growing spontaneously out of reach of the salt spray; and yet requiring, when transplanted into our gardens, no peculiarity of soil or treatment to enable them to support a vigorous existence. These are instances of plants to which our climate appears entirely congenial, and yet which seem as if they could not propagate themselves with us or spread, except under man's protection. Others, again, appear to require only to get a footing in a foreign soil to become established in it with extraordinary rapidity, even to the overmastering or expulsion of some of the indigenous inhabitants. When Australia and New Zealand were first colonized by Europeans, their flora presented an aspect of perfect strangeness, very few of the native trees or flowers belonging even to genera common to Europe. The seeds of some of our English weeds were, however, introduced, intentionally or accidentally, by the early settlers; and now the thistle covers the waste lands of Australia as it does in England, and the clover and the groundsel everywhere remind the Englishman of his far-away home, and have become as completely at home as the mustangs or wild-horses on the pampas of South America. In our own country a very remarkable instance of this rapid naturalization has occurred in the case of the *Elodea Canadensis* or Canadian water-weed; which, introduced not many years since into our canals from Canada, has now become such a pest in many places as seriously to impede the navigation. Other instances might be mentioned of foreign plants introduced with seed having in a very short time become common weeds in all cultivated land. Indeed, many of the species included in our handbooks of British plants are so entirely confined to arable land or to spots in the immediate vicinity of human dwellings, that it is impossible to say how many of them may be really indigenous to the soil, and how many naturalized aliens.

There is no doubt we have a great deal to learn as to the mode in which plants propagate themselves in nature, which may be of the utmost value to our gardeners. Every one is familiar with the fact of the apparently spontaneous appearance in immense abundance, of plants in soil when subjected to certain farming operations, or on the sowing of some particular crop. Whenever a new railway cutting or embankment is made, some plant unknown in the neighborhood is almost sure to appear, and either permanently establish itself or again disappear after a few years. The "sowing" of land with lime is invariably followed by the appearance of a crop of white or Dutch clover. When certain kinds of wood are cut down it is said that during the next year a particular species of moss will always be found covering the ground. Immediately after the great fire of London in 1666, the London Rocket (*Sisymbrium Irio*) sprang up in enormous quantities on the dismantled walls, but is now no longer to be found in the metropolitan district. The usual theory to account for this sudden appearance of new plants is the existence in the soil of large "stores of seeds" ready to germinate on the first favorable opportunity. In his Anniversary Address to the Linnæan Society in 1869, Mr. Bentham, however, pointed out that if this explanation was the true one, it ought not to depend merely on theory, but would be capable of easy practical verification. He suggested whether a hitherto insufficiently acknowledged part in the rapid dissemination of plants may not be played by birds. The whole subject presents a wide field for farther investigation, and must amply reward any one who takes up the inquiry, if endowed with the qualities of accurate observation and patient research.

Mr. Mongredien's "Planter's Guide" deals chiefly with the introduction into this country of foreign trees and shrubs. Within the last twenty or thirty years the appearance of our lawns and plantations has been greatly changed by the number of new forms which have made their appearance. The

stately *Wellingtonia*, the formal self-asserting "Puzzle-monkey," or *Arāucaria imbricata*, the massive Deodar and *Cryptomeria*, the elegant *Pinus insignis* and *Cupressus Lawsoniana*, are all still of too recent introduction to permit us to judge of what their effect will be when grown to their full stature. The number of cone-bearing trees from all parts of the world, perfectly hardy in this climate is extraordinary; and, partly from their graceful shape, partly from the evergreen character of their leaves, the attention of cultivators has been perhaps too exclusively confined to them, while deciduous trees have been comparatively neglected. Recent experiments have shown that in this quarter also there is abundant room for an extension of our powers of domestication. In one of the London Parks least frequented by the upper ten thousand, that at Battersea, great success has attended the introduction, during the last few years, of half-hardy trees and shrubs, the precaution being taken of protecting their roots during winter by a layer of some substance impervious to frost. The French have paid more attention to the perfect naturalization of half-hardy plants than we have done; notwithstanding the greater severity of their winter, species are grown by them out of doors which are never seen with us except in greenhouses; even as far north as Paris, the bamboo, for instance, is frequently met with in gentlemen's gardens; and there is no doubt that many shrubs and herbaceous plants, which we never think of attempting to grow except under protection, might, with a very little care and attention, become permanent denizens of our gardens and shrubberies. Probably few are aware that the common Camellia will stand with impunity an ordinary English winter. Mr. Mongredien says that "if protected during the first two or three years after being planted out, and when once established, it proves in the climate of London quite as hardy as the common laurel, and blooms as profusely as in a conservatory. It is true that, from its habit of flowering early in the spring, the blossoms are sometimes

damaged by the nipping easterly winds, but this occurs only in unfavorable seasons; and even if the tree never flowered at all, its lovely foliage would still make it one of the most beautiful evergreens of which our gardens can boast. A plant of the variety *Donkelaarii* has stood out for twelve years in a garden at Forest Hill with a northern aspect, without the slightest protection during the severest winters, and now forms a good-sized bush, densely clothed with magnificent foliage. The Camellia ought to be planted out in every garden, and with a little attention for the first year or two, it would prove quite hardy, at least in the more southern counties, and each season it would increase in attractiveness."

The climate of the south of England is far more congenial to the introduction of foreign trees and shrubs than that of the northern counties, not from the greater severity of the winters in the north, for the minimum temperature of the year is often as low in Kent or Hampshire as in Yorkshire or Northumberland, but from the shorter and cooler summers. Many plants absolutely require a considerable period of high temperature to enable them to ripen their wood sufficiently to withstand the winter frosts, and especially to induce them to flower. In many parts of Scotland, however, the climate is as favorable to horticulturists as in any district in England. In the Duke of Sutherland's estate at Dunrobin, on the east coast of Sutherlandshire, Hydrangeas, myrtles, and other half-hardy plants, grow as freely and as unchecked out of doors as they do in Devonshire or Cornwall. The equalizing effect of the Gulf Stream on the temperature is no doubt the cause of this special immunity from frost. The proximity of the sea-coast is not generally favorable to the growth of trees and shrubs, not so much from the saltiness of the air as from the prevalence of high winds, which are very injurious to growing vegetation. Young and tender shoots which will bear a moderate amount of cold, will sometimes be scorched as if by fire by a tempestuous night.—*The Quarterly Journal of Science.*